

BRIEF REPORT

New Species of Woolly Lemur *Avahi* (Primates: Lemuriformes) in Bemaraha (Central Western Madagascar)

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There are at least three distinct taxa of woolly lemurs (genus *Avahi*) in western Madagascar. The range of *Avahi occidentalis* extends north and east of the Betsiboka River to the Bay of Narinda. *Avahi unicolor* occurs well to the north, including the Ampasindava peninsula and the Manongarivo Special Reserve. Here we describe a third *Avahi* population in central western Madagascar, which was discovered in the Bemaraha Strict Nature Reserve in the Tsingy de Bemaraha region, north of the Manambolo River. The description is based on a released type individual from which we obtained hair samples, photographs, and tape and video recordings. Its entire range is believed to be less than 5,000 km², and forest loss, along with an observed continuing decline in numbers, indicates that this species should be considered Endangered or even Critically Endangered, according to the Red List criteria of the World Conservation Union-IUCN. *Am. J. Primatol.* 67:371–376, 2005.

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INTRODUCTION

In a recent revision regarding the woolly lemurs (genus *Avahi*) in western Madagascar, we demonstrated that these primates occur in at least three discontinuous geographical zones, each of which supports a distinct taxon [Thalmann & Geissmann, 2000]. The largest zone extends from north and east of the Betsiboka River to the Bay of Narinda [Tattersall, 1982] and includes the Anakarafantsika National Park and the Ampijoroa Forestry Reserve (Fig. 1). This is the geographic range of the best-known of the three species, *A. occidentalis*.

A second area is situated well to the north, including the Ampasindava peninsula [Milne-Edwards & Grandidier, 1875a,b] (Thalman, 2003, personal observation) and the Manongarivo Special Reserve [Raxworthy & Rakotondrapary, 1988]. We previously described this northern population as a distinct

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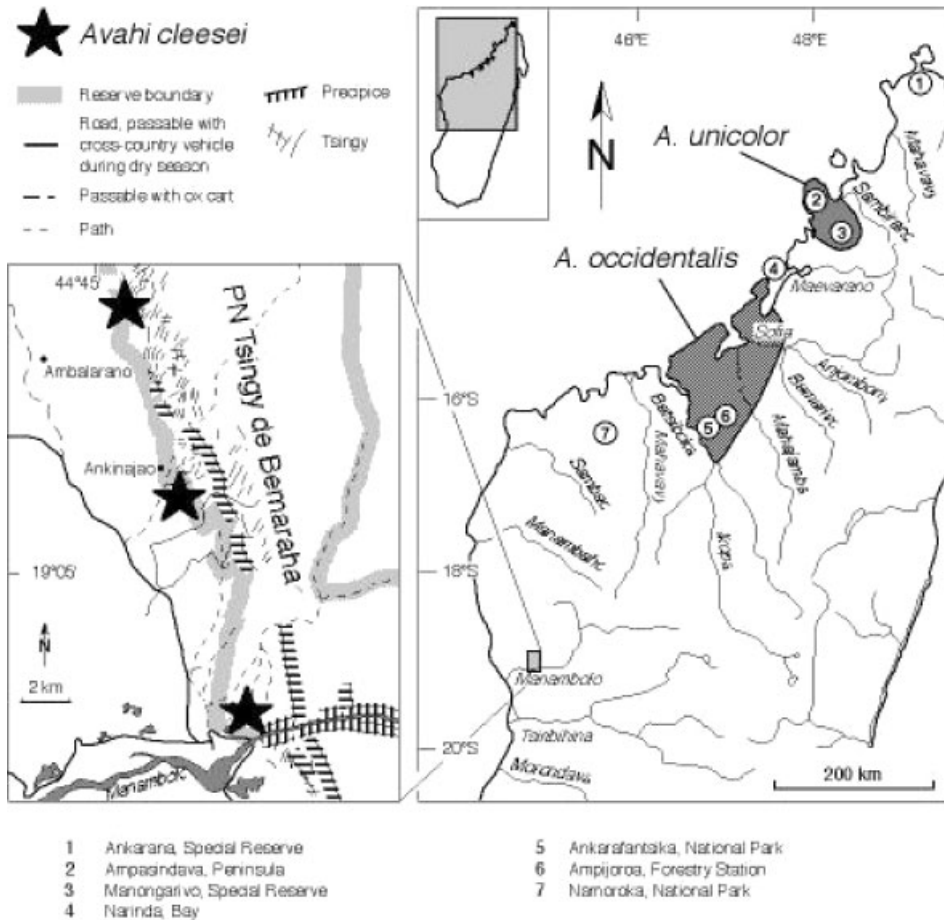


Fig. 1. Distribution map of western taxa of woolly lemurs.

species: *A. unicolor* [Thalmann & Geissmann, 2000]. Hawkins et al. [1990] also reported observations of *Avahi* in the Ankarana Special Reserve in northern Madagascar, but the taxon to which these animals belong remains unclear.

A third *Avahi* population was discovered in the Bemaraha Strict Nature Reserve (recently reclassified as a national park) in western Madagascar in 1990 [Mutschler & Thalmann, 1990; Rakotoarison et al., 1993; Thalmann & Rakotoarison, 1994]. Although our comparative study suggested that this southern population constitutes a distinct taxon, we did not name it because we believed that a species could not be given a name until a specimen had been collected and preserved as the name-bearing type [Thalmann & Geissmann, 2000].

A whole and carefully preserved specimen (ideally a series) is recommended as convincing evidence for the validity of a proposed species. However, in this case the common procedure used by taxonomists to collect one or several animals or to capture and donate them to a zoo in order to obtain type specimens when they die (e.g., as in the cases of *Haplemur aureus* [Meier et al., 1987] and *Propithecus*

tattersalli [Simons, 1988]) was not an option for us. For ethical reasons we are reluctant to collect specimens of highly endangered primates, and currently it is virtually impossible to keep woolly lemurs alive in captivity for more than a few days [Harcourt & Thornback, 1990; Petter et al., 1977].

The International Code of Zoological Nomenclature does not require a museum specimen as type material, and indeed it never has, as recently pointed out by Wakeham-Dawson et al. [2002]. The idea that it is necessary to kill a rare animal in order to name it is a misunderstanding. Wakeham-Dawson et al. [2002] attributed this misconception to the wording of early editions of the Code and subsequent compounds in taxonomy textbooks. The introduction to the fourth (current) edition [International Commission for Zoological Nomenclature, 1999, p xxvii] states that “when the name-bearing type of a species group taxon proposed after 1999 consists of a preserved specimen or specimens, the proposer is required to include a statement naming the collection in which the name-bearing type is or will be deposited.” The conditional statement of this sentence makes it clear that the Code does not demand a dead type specimen [Wakeham-Dawson et al., 2002]. Hence, we describe and name the woolly lemur from Bemaraha as a new species based on a released type for which we have hair samples, photographs, and tape and video recordings. The identification is based on a comparison of all museum specimens of western woolly lemurs known to us ($n = 16$), sightings of more than 33 individuals in the field (17 in Bemaraha, > 16 in Ampijoroa), photographs of different individuals (five from Bemaraha and nine from Ampijoroa), videotapes (one in Bemaraha and more than two in Ampijoroa), and the detailed examination of anesthetized animals (one from Bemaraha and five from Ampijoroa). More details on the materials and methods used, and the habitat of the new species can be found in Thalmann and Geissmann [2000].

DESCRIPTION OF THE NEW SPECIES

Avahi cleesei: New Species

Bemaraha form [Thalmann & Geissmann, 2000].

Holotype (Fig. 2)

Avahi male (body weight = 830 g) captured in Bemaraha on 3 October 1991.

Material

Hair samples (AIMZ 13854.a), accompanying photographs (AIMZ 13854.b-n), and videotape (AIMZ 13854.o) and audiotape recordings (AIMZ 13854.p) of the specimen are stored in the Anthropological Institute and Museum of the University of Zurich (AIMZ), Zurich, Switzerland.

Type locality

18°59'S, 44°45'E, approximately 3 km east-northeast of the village of Ambalarano, western Madagascar (Fig. 1).

Etymology

Named in honor of British actor and comedian John Cleese for his promotion of conservation issues in movies such as *Fierce Creatures* [Chepisi & Young, 1997] and documentaries such as *Born to be Wild: Operation Lemur With John Cleese* [Kershaw & Cleese, 1999].

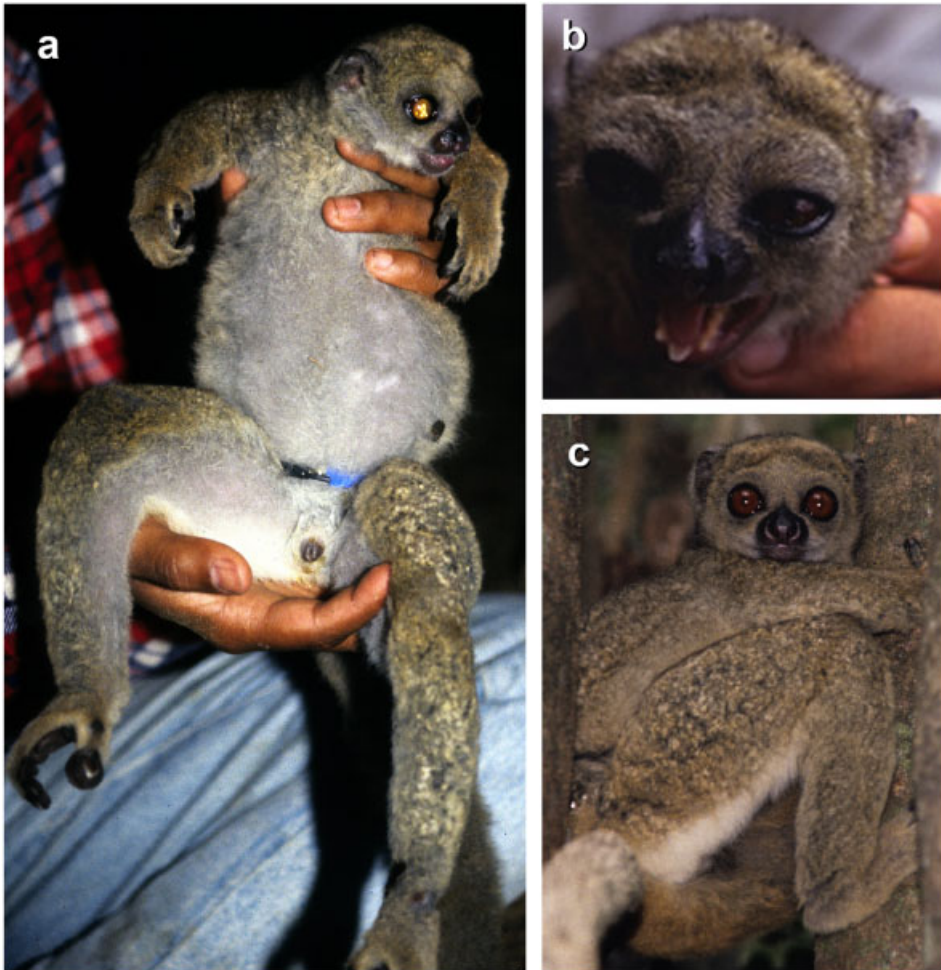


Fig. 2. Type photographs (AIMZ 13854.b-d) of an adult male *Avahi cleesei* after it was captured on 3 October 1991 (a and b) and after it was released on 4 October 1991 (c). [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

Diagnosis

Distinguished from *A. occidentalis* by its lack of a white facial mask and broad dark eye-rings, and from both *A. occidentalis* and *A. unicolor* by the presence of a dark chevron pattern on the forehead.

Description (Fig. 2)

The face of *A. cleesei* is only slightly paler than the upper forehead and crown. The facial area above the nose extends upward toward the forehead (Fig. 2c). This upward extension contrasts with the virtually opposite pattern created by the triangle of forehead pelage that invades the facial area in other western *Avahi* (e.g., *A. occidentalis* and *A. unicolor*). The forehead fur immediately bordering the facial area is blackish and forms a dark chevron pattern above the facial area. The eyes are maroon and have black, hairless eyelids. The snout is also black and

hairless. The fur surrounding the corners of mouth is whitish. The fur on the head and body has a brown-gray coloration and a woolly (slightly curled) flecked appearance. The tail is beige or brown-gray, and is slightly reddish only on the dorsal side of the root. The inner dorsal surface of the lower limbs is white. The fur of the chest, belly, and inner surface of the upper limbs is relatively thin, downy, and very light gray.

Distribution

This species has been found only in the Tsingy de Bemaraha region north of the Manambolo River. The northern limit is unclear. There is no evidence from surveys and interviews that it is distributed in the wider surroundings of Bemaraha [Ausilio & Raveloanrinoro, 1998; Sterling, 1998], the Namoroka Strict Nature Reserve (between the Sambao and Mahavavy rivers [Hawkins et al., 1998; Thalmann et al., 1999], or between the Mahavavy and Betsiboka rivers [Curtis, 1997; Thalmann & Geissmann, 2000].

Vernacular names

Locally, these animals are called Dadintsifaky, which translates to “grand-parent of the sifaky” (*Propithecus*). As a vernacular name in English, we propose Cleese’s woolly lemur or Bemaraha woolly lemur.

CONSERVATION

Avahi cleesei clearly falls into the category of Endangered (EN) as established by the IUCN Red List [IUCN, 2001], according to the following criteria (B1ac(i, ii, iii, v)): the extent of occurrence is estimated to be less than 5,000 km² (B1), the species is known in just one location (B1a), and the known population is declining (B1c) in the extent of occurrence (i); area of occupancy (ii); area, extent, and/or quality of habitat (iii); and number of mature individuals (v).

However, more detailed analyses and surveys may reveal that the taxon should be moved to the Critically Endangered (CR) category. For example, the disturbed forest close to the village of Ankinajao, which supported a substantial number of individuals in 1994 [Thalmann & Geissmann, 2000], had been cut completely by 2003 (Thalmann, unpublished data). The subhumid forest at the base of the escarpment of the Tsingy de Bemaraha is under continuous pressure from bush fires that reduce it in many places every year—in some places to only a few meters in width. Such subhumid forests are the only habitat in which *Avahi cleesei* is known to occur so far.

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REFERENCES

- Ausilio E, Raveloanrinoro G. 1998. Les lémuriens de la région de Bemaraha: Forêts de Tsimembo, de l'Antsingy et de la région de Tsiandro. *Lemur News* 3:4–7.
- Chepisi F, Young R. 1997. *Fierce creatures*. Sony Pictures Entertainment, USA/UK, film.
- Curtis DJ. 1997. The mongoose lemur (*Eulemur mongoz*): a study in behaviour and ecology. Ph.D. dissertation, University of Zurich, Zurich, Switzerland. 178p.
- Harcourt C, Thornback J. 1990. Lemurs of Madagascar and the Comoros. The IUCN red data book. Gland, Switzerland/Cambridge, UK: IUCN. 240p.
- Hawkins AFA, Chapman P, Ganzhorn JU, Bloxham QMC, Barlow SC, Tonge SJ. 1990. Vertebrate conservation in Ankarana Special Reserve, northern Madagascar. *Biol Conserv* 54:83–110.
- Hawkins AFA, Durbin JC, Reed D. 1998. The primates of the Baly Bay area, north-western Madagascar. *Folia Primatol* 69: 337–345.
- International Commission for Zoological Nomenclature. 1999. International code of zoological nomenclature. 4th ed. London: International Trust for Zoological Nomenclature. 175p.
- IUCN. 2001. International Union for the Conservation of Nature and Natural Resources Red List categories and criteria: version 3.1. IUCN Species Survival Commission. Gland, Switzerland/Cambridge, UK: IUCN. 30p.
- Kershaw J, Cleese J. 1999. *Born to be wild—Operation Lemur with John Cleese*. WNET/BBC, UK, film.
- Meier B, Albignac R, Peyriéras A, Rumpler, Wright P. 1987. A new species of *Hapalemur* (Primates) from southeast Madagascar. *Folia Primatol* 48:211–215.
- Milne-Edwards A, Grandidier A. 1875a. Histoire naturelle des mammifères, tome IV, atlas I. In: Grandidier A, editor. Histoire physique, naturelle et politique de Madagascar. Vol. 9. Histoire naturelle des mammifères. Paris: Imprimerie Nationale.
- Milne-Edwards A, Grandidier A. 1875b. Histoire naturelle des mammifères, tome I, texte I. In: Grandidier A, editor. Histoire physique, naturelle et politique de Madagascar. Vol. 6. Les Indrisiné. Paris: Imprimerie Nationale.
- Mutschler T, Thalmann U. 1990. Sighting of *Avahi* (woolly lemur) in western Madagascar. *Primate Conserv* 11:15–17.
- Petter J-J, Albignac R, Rumpler Y. 1977. Mammifères lémuriens (Primates Prosimiens). Paris: ORSTOM/CNRS. 513p.
- Rakotoarison N, Mutschler T, Thalmann U. 1993. Lemurs in Bemaraha (world heritage landscape), western Madagascar. *Oryx* 27:35–40.
- Raxworthy CJ, Rakotondraparany F. 1988. Mammals report. In: Quansah N, editor. Manongarivo Special Reserve (Madagascar), 1987/88 expedition report. London: Madagascar Environmental Research Group. p 122–130.
- Simons EL. 1988. A new species of *Propithecus* (primates) from northeast Madagascar. *Folia Primatol* 50:143–151.
- Sterling EJ. 1998. Preliminary report on a survey for *Daubentonia madagascariensis* and other primate species in the west of Madagascar, June–August 1994. *Lemur News* 3:7–8.
- Tattersall I. 1982. *The primates of Madagascar*. New York: Columbia University Press. 382p.
- Thalmann U, Rakotoarison N. 1994. Distribution of lemurs in central western Madagascar, with a distribution hypothesis. *Folia Primatol* 63:156–161.
- Thalmann U, Kerloc'h P, Müller AE, Zaramody A. 1999. A visit to the Strict Nature Reserve Tsingy de Namoroka (NW Madagascar). *Lemur News* 4:16–19.
- Thalmann U, Rakotoarison N. 1994. Distribution of lemurs in central western Madagascar, with a distribution hypothesis. *Folia Primatol* 63:156–161.
- Thalmann U, Geissmann T. 2000. Distribution and geographic variation in the western woolly lemur (*Avahi occidentalis*) with description of a new species (*A. unicolor*). *Int J Primatol* 21:915–941.
- Wakeham-Dawson A, Morris S, Tubbs P. 2002. Type specimens: dead or alive? *Bull Zool Nomenclat* 59:282–284.